202201UECM3473OE1b

Start again

Review of preview

Started on	Friday, 28 January 2022, 04:04 PM
Completed on	Friday, 28 January 2022, 04:04 PM
Time taken	5 secs
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

The random variable X ha the density function with parameter β given by

$$f(x;\beta) = (1/\beta^4)x^3e^{-(1/4)(x/\beta)^4},\ x > 0,\ \beta>0.$$

You are given the following observationof X:

4.9, 1.2, 3.8, 6.8, 4.0.

Determine the method of moments estimate of β. [Note: Γ(1+1/4) = 0.9064.] _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 3.229835

Marks for this submission: 0/1.

2

Marks: 1

You are given the following data for claim sizes:

Claim size	Number of claims
Under 1400	15
[1400, 2800)	7
2800 and up	3

The data are fit to an exponential distribution using maximum likelihood. Determine the fitted mean. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 1413.57

Marks for this submission: 0/1.

3

Marks: 1

An auto liability coverage has a claims limit of 150. Claim sizes observed are

24, 50, 56, 89, 150

where the claim at 150 was for exactly 150. In addition, there are 3 claims above the limit. The data are fitted to an exponential distribution. Determine the MLE of θ. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 163.8

Marks for this submission: 0/1.

4
Marks: 1

Annual claim counts follow a geometric distriution with mean β.

- 89 policyholders submitted 0 claims.
- 25 policyholders submitted 1 claim.
- 4 policyholders submitted 2 claims.
- For two policyholders, it is know that they submitted either 1 claim or 2 claims, but the exact number of claims is not available.
- No policyholder submitted more that 2 claims.

Estimate β using maximum likelihood. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.2947
Marks for this submission: 0/1.

5
Marks: 1

9 losses have been recorded in thousands of dollars and are grouped as follows:

Interval	[0, 1)	[1, 8)
Number of Losses	2	7

There is no record of the number of losses at or above 8,000. The random variable X underlying the losses, in thousands, has the density function

$$f(x) = \lambda e^{-\lambda x}, x > 0, \lambda > 0.$$

Determine L(λ) and MLE of λ. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.1913
Marks for this submission: 0/1.

6
Marks: 1

For an insurance policy, you are given:

- Ground-up losses follow a Weibull distribution with parameters τ =5 and θ(unknown).
- Losses under 590 are not reported to the insurer.
- For each loss over 590, there is a deductible of 590 and a policy limit of 1700.
- A random sample of six claim payments for this policy is: 305 590 945 1080 1110+ 1110+

where + indicates that the original loss exceeds 1700. Determine the 73^{th} percentile of the ground-up distribution. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 1766.55
Marks for this submission: 0/1.

7
Marks: 1

You are given:

- Fifty claims have been observed from a lognormal distribution with unknown parameters μ and σ.
- The maximum likelihood estimates are $\hat{\mu}$ = 7.9 and $\hat{\sigma}$ = 1.93.
- The covariance matrix of $\hat{\mu}$ and $\hat{\sigma}$ is $[c_{11} = 0.0344, c_{12} = c_{21} = 0, c_{22} = 0.0195]$

Determine the variance of the probability that the next claim will be less than or equal to 12,516 using delta method. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.001056
Marks for this submission: 0/1.

8
Marks: 1

Two different estimators, ψ and φ, are available for estimating the paramentes, β, of a given loss distribution. To test their performance, you have 90 simulated trials of each estimator, using β = 2, with the following results:

$\Sigma_{i=1}^{90} \psi_i = 168$, $\Sigma_{i=1}^{90} \psi_i^2 = 378$, $\Sigma_{i=1}^{90} \varphi_i = 156$, $\Sigma_{i=1}^{90} \varphi_i^2 = 333$

Calculate $MSE_{\psi}(\beta)/MSE_{\varphi}(\beta)$. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.9562
Marks for this submission: 0/1.

9
Marks: 1

For an insurance coverage, your department only handles claims below 10,000. Among these claims, you observe 6 claims for 800, 1000, 2000, 2500, 4000, and 5000. In addition, there are 4 claims for amounts below 500, who exact amounts are unknown. You fit these claims to an inverse exponential distribution using maximum likelihood. Determine the resulting estimate for the 71^{th} percentile of claim size for all claims. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 1418.31
Marks for this submission: 0/1.

10
Marks: 1

Parameters for a binomial distribution have been estimated as:

	Estimate	Standard deviation
m	5	0.6
q	0.7	0.02

The correlation between the estimated m and estimated q is -0.44
Using the delta method, determine the upper limit of a 95% symmetric normal confidence interval for the mean of the distribution. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 4.2577
Marks for this submission: 0/1.